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**Racial Difference in Child Penalty**

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# Racial Difference in Child Penalty

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## Abstract

This paper documents large racial differences in the child penalty. Following first childbirth, Black women experience a significantly smaller reduction in labour supply, compared to white women. Most of the racial differences cannot be explained by economic and demographic variables, except household non-labour income. Furthermore, such racial difference widens when controlling for maternal years of schooling, occupation and industries. Finally, it shows that racial difference in child penalty is not correlated with the racial difference in gender norms.

**Keywords:** Race, Child Penalty, Gender Norm, Non-labour Income

**JEL classification:** J13, J15, J16, J22

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# 1. Introduction

Parenthood has long been considered a major cause of gender inequality in the labour market. Using event-study analysis, influential work by Kleven et al. (2019a) shows that the earnings between men and women immediately and substantially diverge after first childbirth and that the gender earning gap remains persistent ever since. Across country analysis shows that the magnitude of child penalty is correlated with gender norms (Kleven et al., 2019b). Furthermore, recent research shows that neither biological factor (Kleven et al., 2021a) nor parental leave policies (Kleven et al., 2021b) can explain the child penalty. Social norms are considered a key potential to determine child penalty.

However, racial difference in child penalty is largely overlooked in the literature<sup>1</sup>. Even within the same country, child penalty is likely to differ substantially by race, because racial difference in gender norms is substantial. For example, most historians argue that gender norms for black households in the US have been substantially less conservative compared to that for white counterparts.

Therefore, this paper use event-study decomposition to examine whether the child penalty differs between black and white women. First, I find substantial racial difference in child penalty in annual earnings, labour force participation and annual hours worked. Child penalty for black women is significantly smaller than that for white women.

Second question is what explains the striking difference in child penalty by race. As economic and demographic situation are different between black and white population, I employ inverse probability weighting methods to construct nearly identical distribution of economic variables between black and white women.

The first set of such control variables are female wage (prior childbirth), husband labour income (which also control for being single or having an unemployed husband) and household non-labour income. These three variables are the three determinants of female labour supply model from a unitary household maximisation problem.

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<sup>1</sup> The only exceptions are several papers in sociology, such as Waldfogel (1997) and Glauber (2007), documenting the insignificant coefficient of the interaction term between a dummy of being Black and a dummy of having a child under age 6 in a pooled OLS regression with log hourly wage as the dependent variable, using women-only sample.

The second set of such control variables are female year of schooling, occupation and industries, as racial difference in child penalty may result from differences in work-related preference from occupations, industries, or years of schoolings.

The third control variable is husband attitude against wife working to investigate if racial difference in gender norm can explain the racial gap in child penalty.

As a result, the racial difference in child penalty virtually unchanged after controlling for her prior childbirth wage and her husband labour income. However, the long-term gap in child penalty between black and white women is narrowed after the household non-labour income distribution is controlled for.

Second, the racial gap in child penalty widens once we control for women's occupation, industry, or year of schooling prior to childbirth. This suggests that controlling for work-related preference and utility gain, the racial difference in child penalty is even larger between black and white women.

Third, controlling for racial difference in gender norms do not change the racial gap in child penalty.

Fourth, heterogeneous analysis shows that racial gap in child penalty remain unchanged when controlling for home ownership or family structure. This is important, as recent study finds that the death of grandmothers significantly affects the magnitude of the child penalty (Miguel, 2021). Therefore, I use sample with home ownership at childbirth or use sample who never had friends, relatives, grandparents lived within the household. Results suggests that racial difference in child penalty is not driven by racial difference in necessity of work to pay monthly rent or by racial difference in household structure with informal help within families.

Section 2 documents related literature. Section 3 explains data and methods. Section 4 present results in event study decomposition. Section 5 concludes.

## **2. Related Literature**

### **2.1 Child penalty**

Parenthood has long been considered a major cause of gender inequality in the labour market. Influential work by Kleven, Landais, and Søgaaard (2019) uses event-study analysis to show

how immediately and substantially the earnings diverge between men and women after first childbirth and how persistent the gender earning gap remains ever since.

Kleven, Landais, and Søgaaard (2021) demonstrate that biological factors do not contribute to such child penalty which is similar among women having a biological child or adoptive child. Furthermore, child penalty is found not have changed in Austria over 60 years despite substantial expansions of parental leave policies (Kleven, Landais, Posch, Steinhauer and Zweimüller, 2021)

Once again, social norms are suggested as a key candidate for future research to establish causality (Kleven et al., 2019a; 2019b; 2021).

To the best of my knowledge, the racial perspective in the child penalty has not been explored in economic research. However, in sociology, Waldfogel (1997) and Glauber (2007) points out that black women do not have a motherhood wage penalty<sup>2</sup> that is substantial for white women.

## **2.2 Social norms and female labour supply**

This article is also related to a recent and growing labour literature that studies the relationship between gender norms and female labour outcomes. For example, Bertrand, Cortes, Olivetti and Pan (2021) investigate how gender attitudes intermediate between female human capital and the marriage gap. Moreover, Nava, Bandiera, Minni, and Quintas-Martínez (2021) quantify social stigma in gender identities to explain the cross-country gender wage gap. In addition, Field, Pande, Rigol, Schaner, and Moore (2021) use randomised control trials to show that gender norms constrain female employment in the private sector in India.

## **2.3 Racial difference in gender norms**

Historians provide two views on why black households have developed less conservative gender norms.

First, slavery may have undermined the conservative gender identities in black households (Davis, 1981). The slavery system may have changed the ideology of womanhood as black women had to work intensively in manual labour. Second, the slave system harshly discouraged male supremacy in Black men.

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<sup>2</sup> Insignificant coefficient of the interaction term between a dummy of being Black and a dummy of having a child under age 6 in a pooled OLS regression with log hourly wage as the dependent variable, using women-only sample.

On the other hand, less conservative gender norms in Black households may be a product of male supremacy and racial discrimination. First, the working-class version of modern manliness is constructed by women's exclusion from paid labour (Melosh, 1993). Powerful manhood identity is a political language, and such construction deliberately excluded other races, refusing to concede that men of other races were equally manly as white men (Bederman, 1993). As Bederman explains, under gender and racial hierarchy, the gender identity of white men was constructed as self-controlled protectors of women and children, and white women as motherly and dedicated to the home. In contrast, non-white men and women were almost identical.

### 3. Data and methods

I follow the specification of event study decomposition as Kleven et al. (2019a 2019b, and 2021). Furthermore, I add individual fixed effects to account for endogenous timing across women entering motherhood earlier or later. Therefore, only within-individual variation is used.

$$Y_{it} = \alpha' D_{it}^{Event} + \beta' D_{it}^{Age} + \gamma' D_{it}^{Year} + v_i + \varepsilon_{it}$$

where  $Y_{it}$  is the labour supply (participation dummy or annual hours worked if participating) of individual  $i$  at event time  $t$ . The first term includes event time dummies, indexed such that  $t = 0$  denotes the year of the arrival of the first child and omits the dummy for  $t = -1$  so that each  $\alpha'$  measures the impact of children each year relative to the year before child arrival. The second and third terms include a full set of age and year dummies to control nonparametrically for life cycle trends and time trends. This specification is run separately for white men, white women, black men and black women.

Data comes from the Panel Study of Income Dynamics (PSID-CDS) from 1967 to 2017. I follow the sample selection criteria of Kleven et al. (2019a) to include only individuals who have their first child between the ages of 20 and 45.

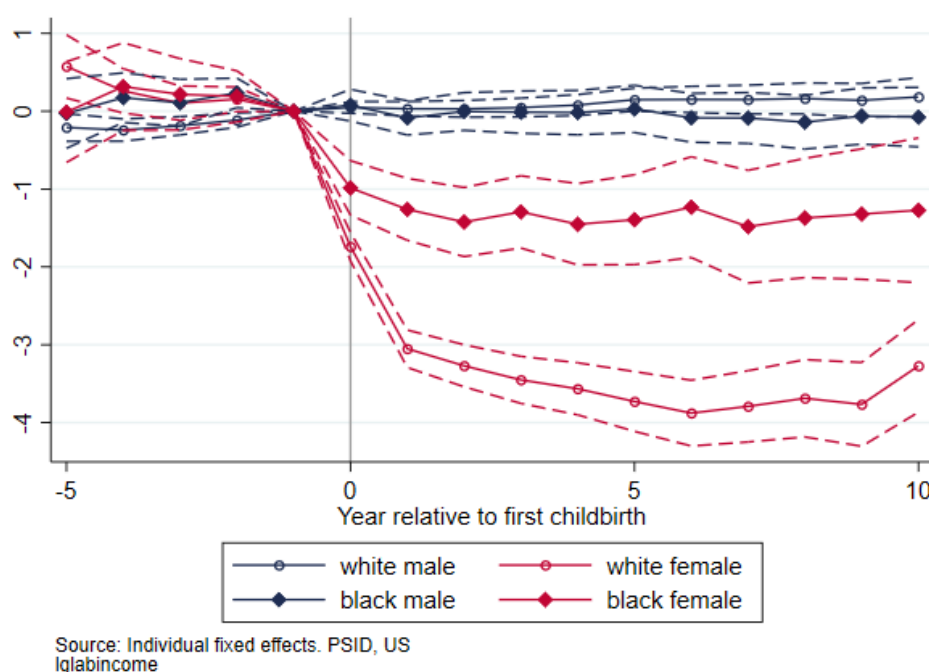
## 4. Results - Child Penalty by Race

This section has three main parts. The first part documents substantial differences between black and white women in child penalty, defined as the reduction in female labour supply following first childbirth. The second part uses the inverse probability weight to construct a nearly identical distribution in economic or demographic observables between black and white women.

### 4.1 Event study analysis

First, there is a substantial racial difference in child penalty, measured as log annual labour income. As shown in Figure 1, the reduction in log annual labour income relative to childbirth is significantly smaller for black women, relative to white women.

**Figure 1. Racial difference in child penalty (log annual labour income)**

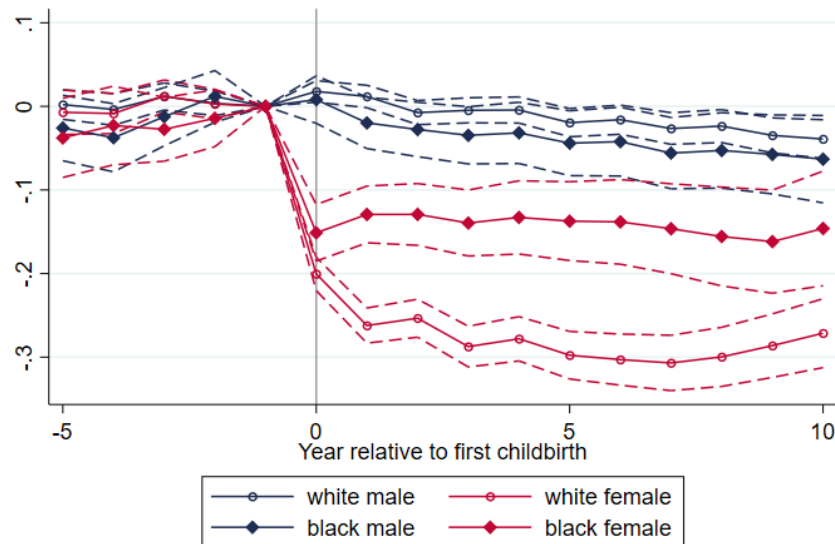


Furthermore, the annual labour income is driven by both extensive margin and intensive margin of labour supply. As shown in Figure 2, the reduction in employment probability for white women dropped around 30 per cent immediately following her first childbirth, whereas it is only around 12 per cent for black women. Moreover, conditional on being in the labour market, the child penalty in annual hours worked is substantially different between black and white women. The racial difference in child penalty at the intensive margin is around 400 hours

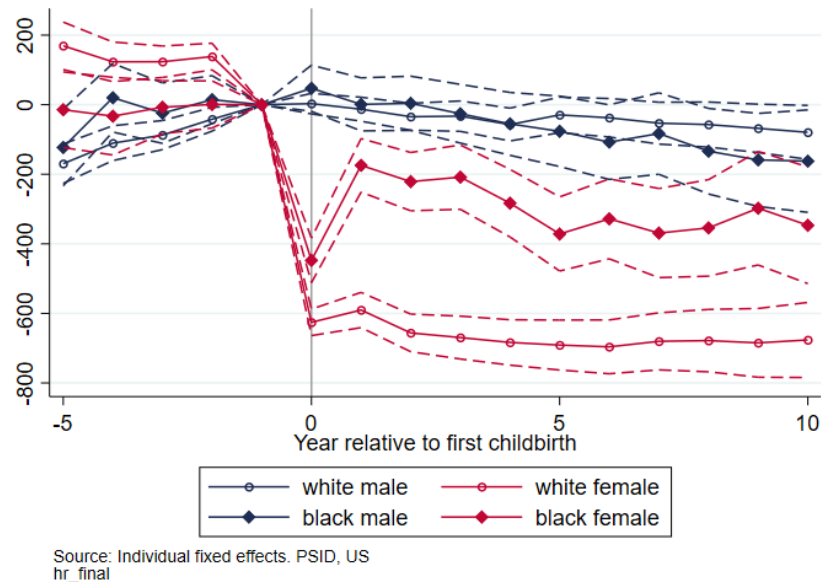


worked. In addition, such racial difference in child-related reduction in female labour supply appears persistent overtime for at least ten years following childbirth.

**Figure 2. Child penalty on female labour supply  
(Extensive margin) employment status**



**(Intensive margin) Annual hours worked**



#### 4.2 Use inverse probability weights to control for the distribution of her wage, husband labour income and household non-labour income

Black and white women are likely to have substantial different potential wage, husband labour income (including being single or having unemployed husband), and household non-labour income. Therefore, I use inverse probability weights to ensure that Black and white women

have the nearly identical distribution of these three control variables. They are chosen because they are the determinants of female labour supply in the unitary household labour supply model.

Household maximise utility from husband's consumption  $c^1$  and leisure  $(1-h^1)$ , wife consumption  $c^2$  and leisure  $(1-h^2)$ , subject to the budget constraint that total consumption is no more than the total income.

$$\max_{(c^1, c^2, h^1, h^2)} U = \tilde{U}(c^1, c^2, 1 - h^1, 1 - h^2)$$

$$\text{subject to } w^1 h^1 + w^2 h^2 + y \geq c^1 + c^2$$

Therefore, optimal female labour supply is determined by her wage,  $w^1$ , or husband wage  $w^2$ , and non-labour income  $y$ .

In addition, I construct the distribution with particular attention to ensure identical mass at  $w^2 = 0$  and  $y = 0$ , between Black and white women to consider that black women are more likely to be single, have an unemployed husband, and not have any non-labour household income. Moreover, all economic variables are adjusted by the consumer price index.

As shown in Figure 3.a.1, two differences appear in the wage distribution between black and white women. First, white women have a higher labour market participation one year before childbirth. Second, there are more white women having a high hourly wage compared to black women.

The inverse probability weights are constructed such that employment status and wage distribution become identical between black and white women, as shown in Figure 3.a.2.

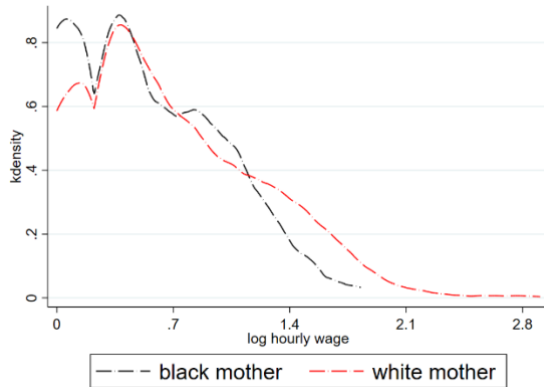
Furthermore, there is a substantial difference in non-labour income between black and white households, as shown in Figure 2.b.1. Therefore, inverse probability weights are also constructed to generate the identical distribution of non-labour income between black and white households.

Husband labour income is also fully controlled for by inverse probability weights. In addition, mass at 0 is also constructed identically to control for the share of single women, and the share of unemployed husbands, shown in Appendix A1. As expected, there are more black women without a husband or with an unemployed husband. In addition, black women's husband has systematically lower annual labour income.

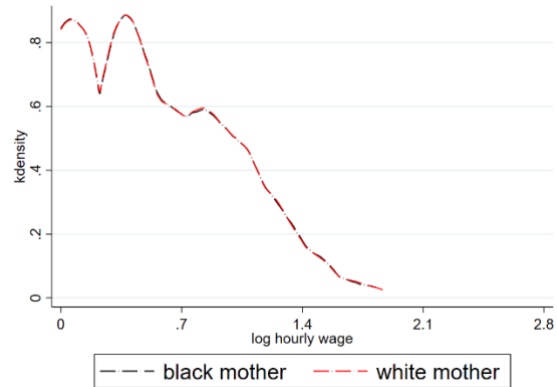
**Figure 3. Distribution of economic variables between black and white women**

**a. Log hourly wage prior childbirth\***

a1. Without IPW weights

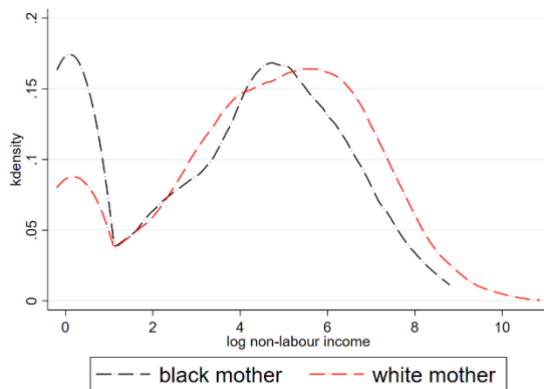


a2. With inverse probability weights

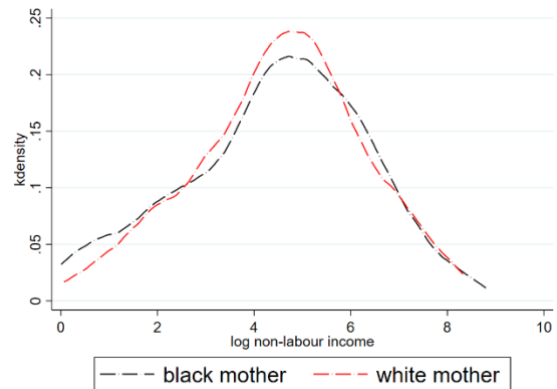


**b. Log household non-labour income\*\***

b1. Without IPW weights



b2. With IPW weights

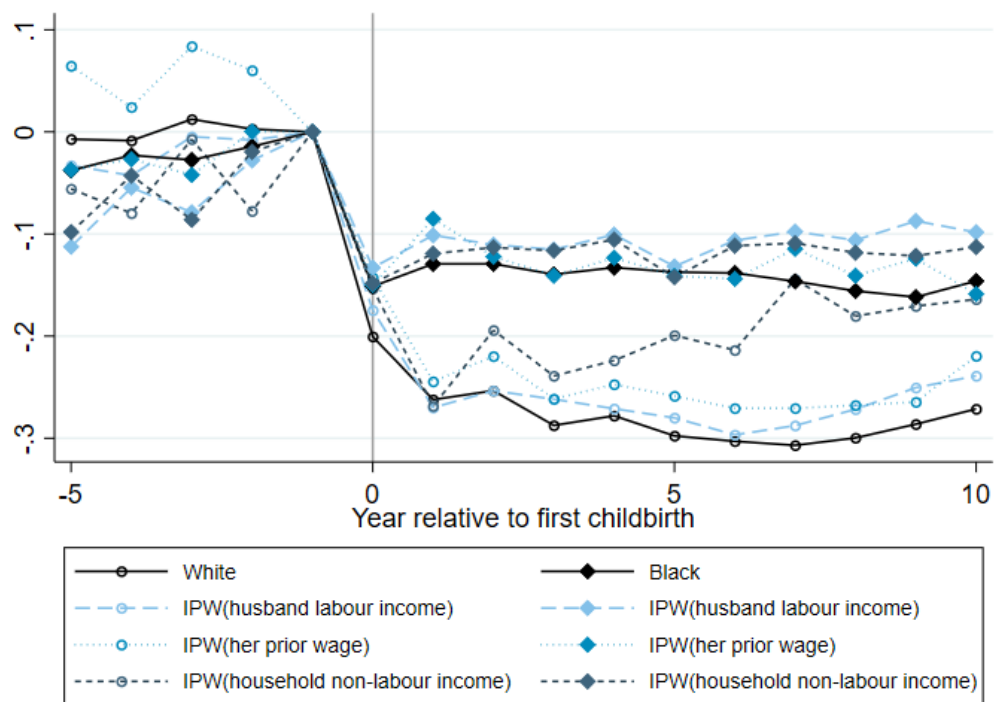


Note: \* Prior child birth is calculated as the average within 3 years before first childbirth. \*\* Log female wage for women unemployed 1 year before childbirth are recoded to have log female wage equal to 0. So, the distribution include both employment status and wage distribution. Annual average household non-labour income is calculated within 2 years before and 2 years after first childbirth). The distribution does not change much when using different period. All economic variables are CPI adjusted. Source: PSID.

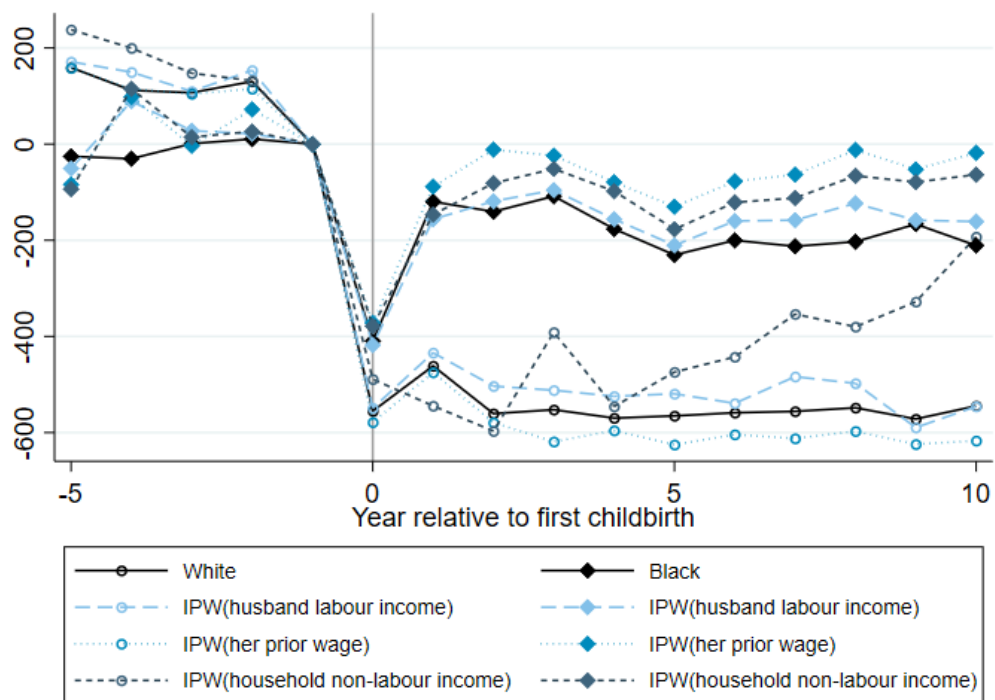
Then, I conduct event study analysis using inverse probability weights as probability weights in regression. Similar to research on the racial difference in labour supply (Goldin, 1977; Boustan and Collins, 2013), controlling for economic observables has virtually no impact on the racial difference in child penalty, as shown in Figure 4.

**Figure 4. Racial difference in child penalty after control for distribution of economic variables**

**a. Employment penalty**



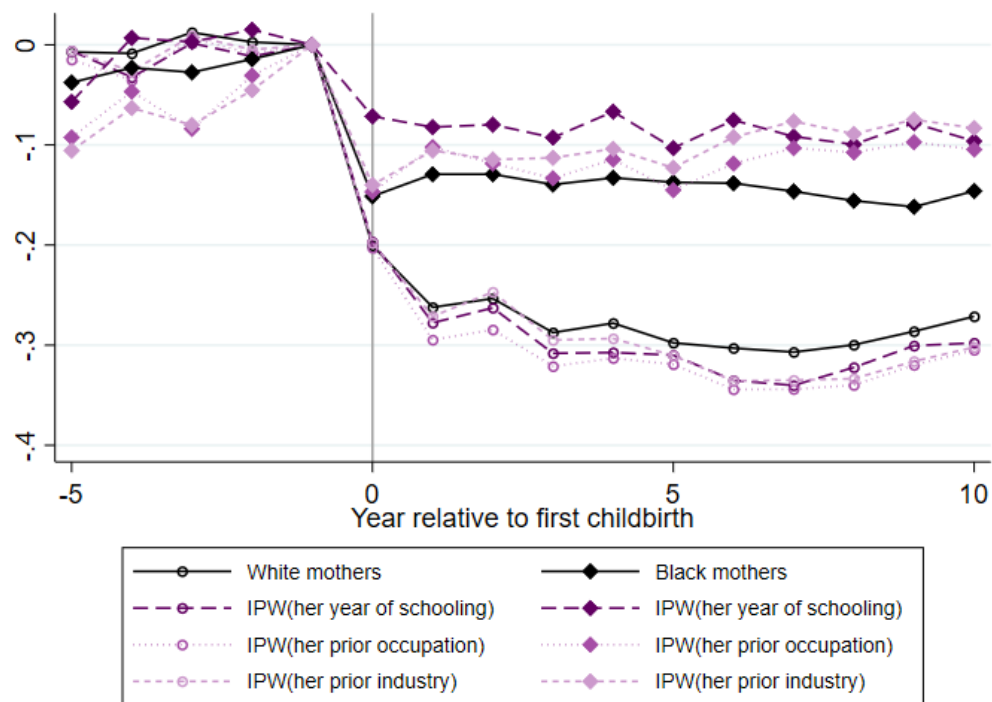
**b. Annual hours worked penalty**



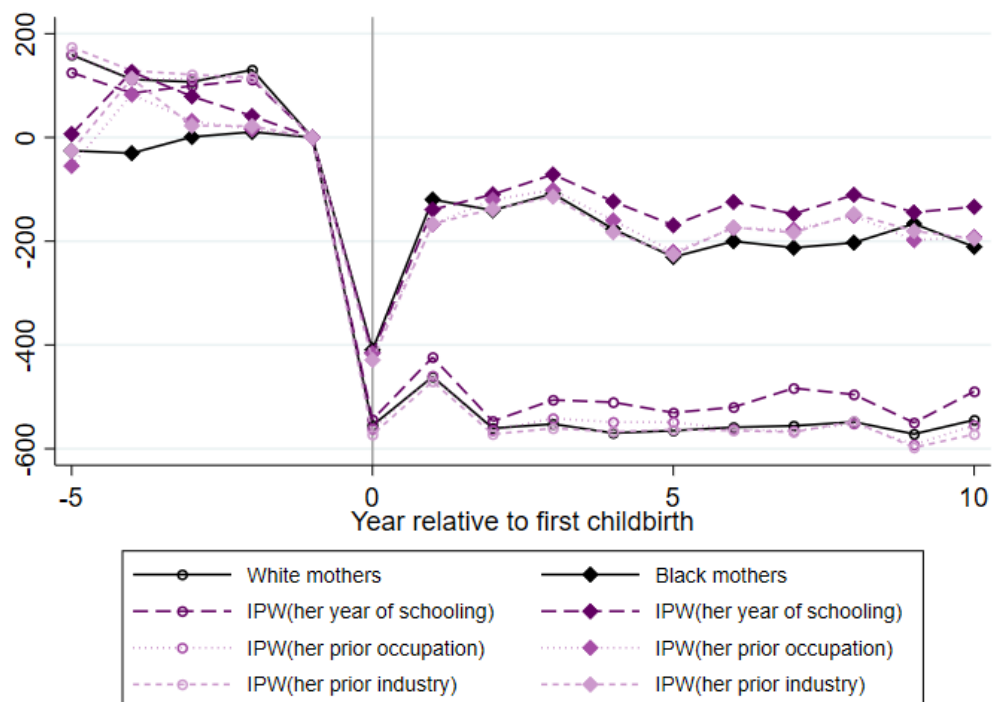
Note: Sample selection (individuals having first child at age between 20 and 45) . Source: PSID (1967-2017)

**Figure 5. Racial difference in child penalty after control for distribution of work variables**

**a. Employment penalty**



**b. Annual hours worked penalty**



Note: Sample selection (individuals having first child at age between 20 and 45) . Source: PSID (1967-2017)

### 4.3 Use Inverse Probability to Control for Maternal Year of Schooling, Occupation and Industry

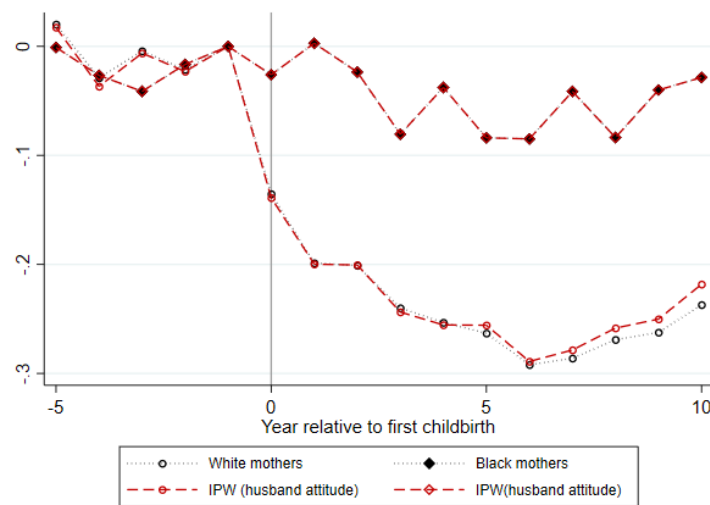
The child penalty may differ between black and white women due to differences in work related preference by occupation, industry or years of schooling. I calculate the inverse probability weight to fully construct nearly identical distribution in these factors between black and white women. As shown in Figure 5, the racial difference in child penalty has increased after fully controlling for these variables. The distribution between black and white women in these variables before and after weighting is shown in Appendix A2.

### 4.4 Use Inverse Probability to Control for Gender Norms

Due to data limitation, gender attitude is only measured in 1976 and 1977. Therefore, although fully control for racial difference in gender norms, I can only run the analysis with a sub sample of individuals whose husband's gender attitude is measured. As a result, the racial gap in child penalty virtually does not change after controlling for husband resistance against wife working does not narrow, as shown in Figure 5.

The distribution in gender norms by race with and without weighing is shown in Appendix A3.

**Figure 5. Racial difference in child penalty after control for distribution of gender norms**



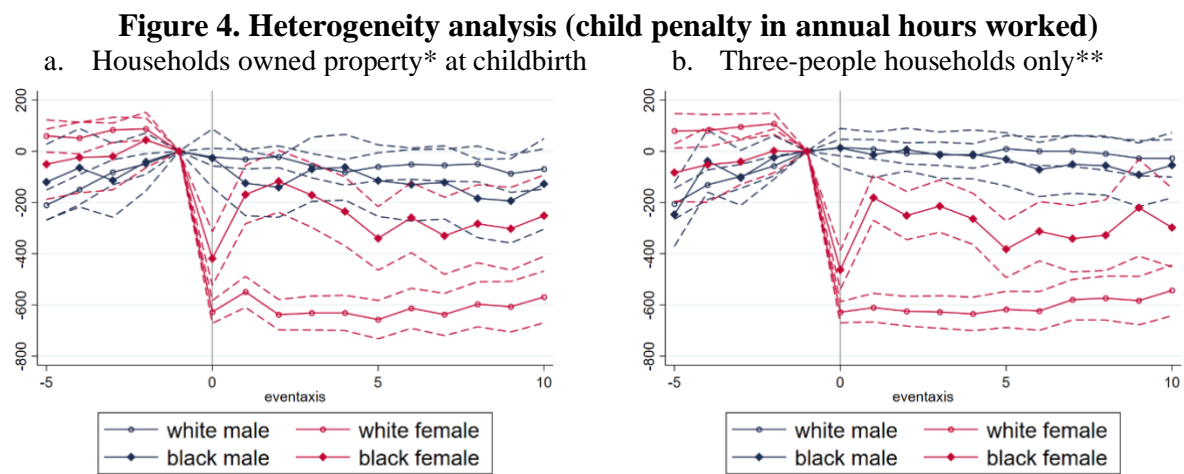
### 4.5 Use Heterogeneity Analysis to Control for Home ownership or Household Structure

Another way to investigate the determinants of the racial gap in child penalty is to conduct heterogeneity to limit the sample to more alike white and black women.

To investigate if black women worked for necessity, I restrict the sample owning the property where they live during the first year after childbirth. So, neither black nor white women in the sample were pressured to work to pay for the rent.

To investigate if the family structure in black households is different such that black women have more help in childcare from families, I restrict the sample consisting of households only appearing as 3-people households throughout the entire PSID. Three-people family structure means that the household never contains other husband or wife relatives (such as siblings, in-laws, parents) or unrelated people (such as foster children or friends.)

As shown in Figure 4, controlling for these two factors does not reduce the racial difference in child penalty (intensive margin.) In addition, the racial gap in the employment penalty also remains unchanged, shown in Appendix A4.



Note: Households own the property where they lived in the first year after childbirth. \*\* Households never contain other husband or wife relatives (such as siblings, in-laws, parents) or unrelated people (such as foster children or friends.)

## 5. Conclusion

This study shows a striking difference in child penalty between black and white women. Most economic, demographic and norm variables do not explain most of the racial gap in child penalty. However, household non-labour income can explain some of the long-run differences. This suggests an important research question for future research on how the racial wealth gap explains the difference in female labour supply by race.

Another important next step is to understand how racial differences in child penalties in female labour supply have contributed to the achievement gap between Black and white children, which is well established in the literature. Given findings in this paper, the disadvantage in early child development of black children may result from the absence of black women at home whose time is arguably the most productive input in child development.

## Reference

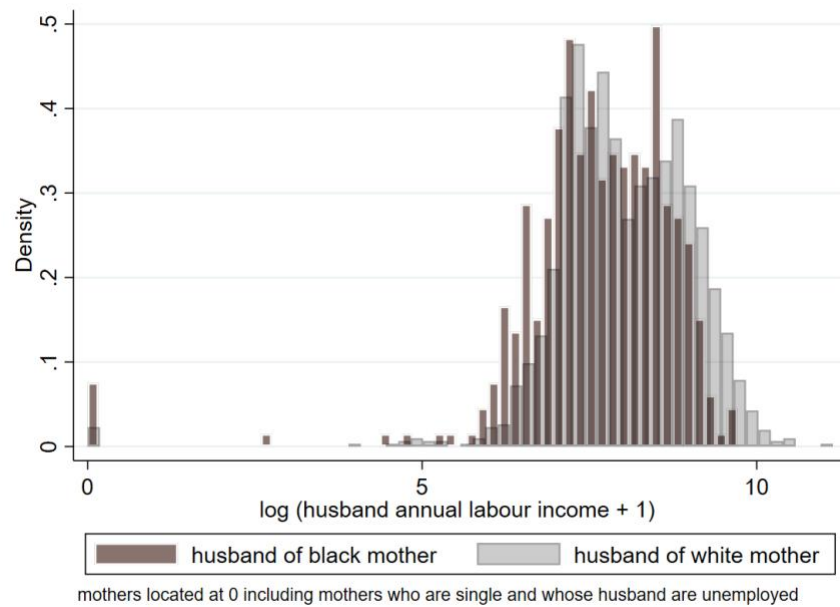
- Bederman, G. (1993) Civilisation, the Decline of Middle-class Manliness, and Ida B. Well's Anti-Lynching Campaign (1892-94). In Melosh, B. (Ed.), *Gender and American history since 1890* (Rewriting histories series). London: New York: Routledge.
- Bertrand, M., Cortes, P., Olivetti, C., & Pan, J. (2021). Social Norms, Labour Market Opportunities, and the Marriage Gap Between Skilled and Unskilled Women. *The Review of Economic Studies*, 88(4), 1936-1978.
- Blau, F., & Kahn, L. (2017). The gender wage gap. *Journal of Economic Literature*, 55(3), 789-865.
- Boustan, L. & Collins, W. (2013) The Origins and Persistence of Black-White Differences in Women's Labor Force Participation. *NBER working paper*, w19040
- Davis, A. (1981). *Women race and class*. London: Women's Press.
- Field, E., Pande, R., Rigol, N., Schaner, S., & Troyer Moore, C. (2021). On Her Own Account: How Strengthening Women's Financial Control Impacts Labor Supply and Gender Norms. *The American Economic Review*, 111(7), 2342-2375.
- Glauber, R. (2007). Marriage and the Motherhood Wage Penalty Among African Americans, Hispanics, and Whites. *Journal of Marriage and Family*, 69(4), 951-961.
- Goldin, C. (1977). Female Labor Force Participation: The Origin of Black and White Differences, 1870 and 1880. *The Journal of Economic History*, 37(1), 87-108.
- Goldin, C. (1991). The Role of World War II in the Rise of Women's Employment. *The American Economic Review*, 81(4), 741-756.
- Kleven, H., Landais, C., Posch, J., Steinhauer, A., & Zweimüller, J. (2019). Child Penalties across Countries: Evidence and Explanations. *AEA Papers and Proceedings*, 109, 122-126.
- Kleven, H., Landais, C., & Søgaaard, J. (2019). Children and Gender Inequality: Evidence from Denmark. *American Economic Journal. Applied Economics*, 11(4), 181-209.
- Kleven, H., Landais, C., & Søgaaard, J. (2021). Does Biology Drive Child Penalties? Evidence from Biological and Adoptive Families. *The American Economic Review. Insights*, 3(2), 183-198.
- Melosh, B. (1993) Manly Work: Public Art and Masculinity in Depression America. In Melosh, B. (Ed.), *Gender and American history since 1890* (Rewriting histories series). London: New York: Routledge.
- Miguel T. (2021) Grandmothers and The Gender Gap In The Mexican Labor Market.
- Waldfoegel, J. (1997). The Effect of Children on Women's Wages. *American Sociological Review*, 62(2), 209-217.



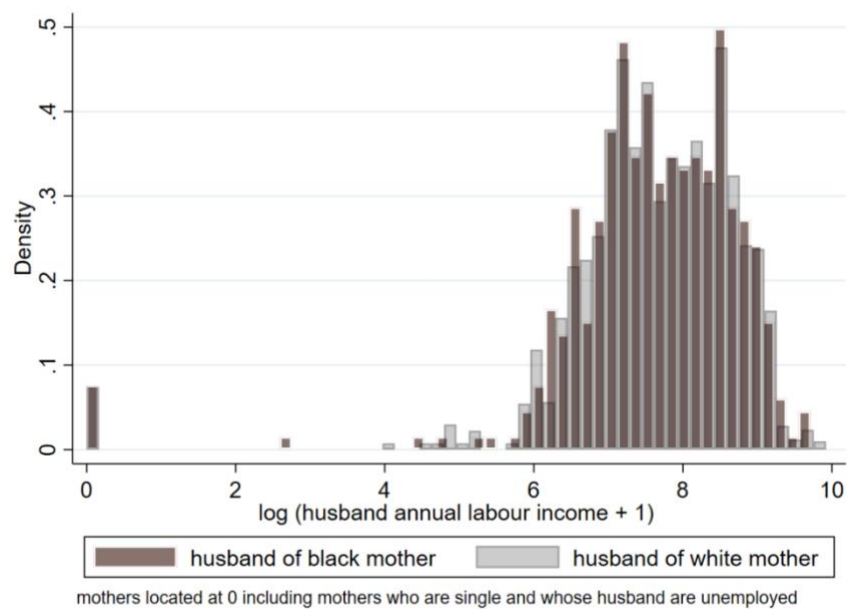
## Appendix. A1

Figure A1. Husband labour income

**a. Without weighting**



**b. with weighting**



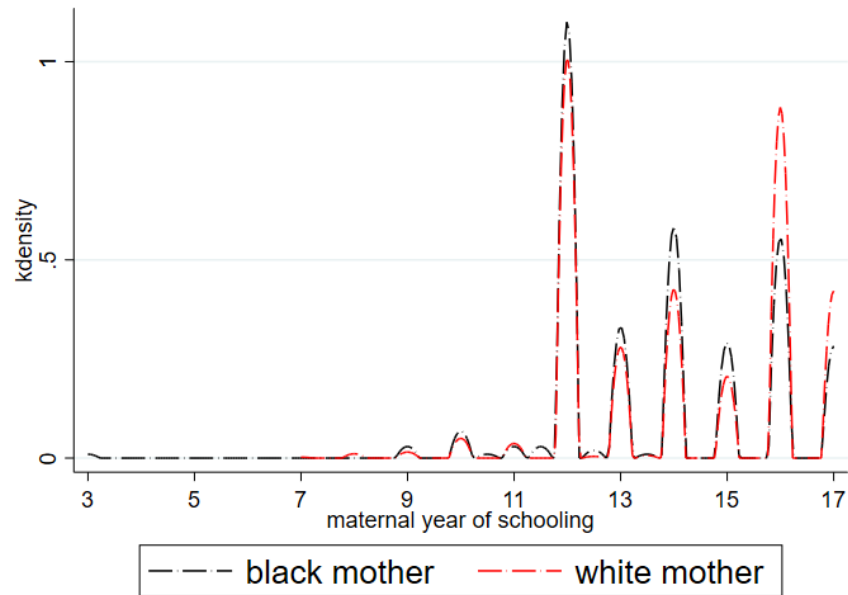
Here, the husband labour income using log transformation after adding value 1. Therefore, women do not have a husband or have an unemployed husband will be located at log of husband labour income at 0. There are two main differences, presented in Figure 2. First, as expected, there are more black women having no husband or unemployed husband. Second, white women's husband have systematically

higher hourly wage. After applying the inverse probability weight, the distribution of husband labour income is nearly identical between black and white women.

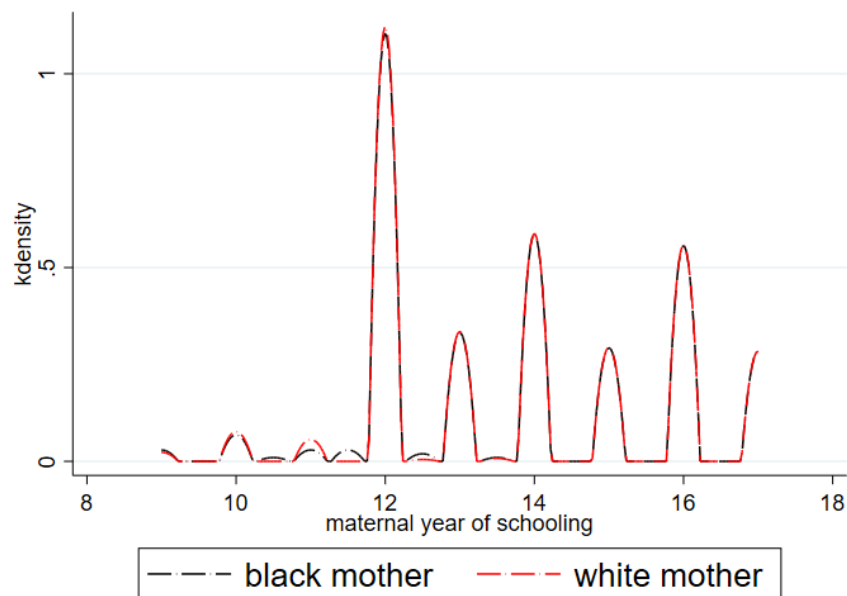
## Appendix. A2

Figure A2.1 Wife year of schooling

**a. Without weighting**

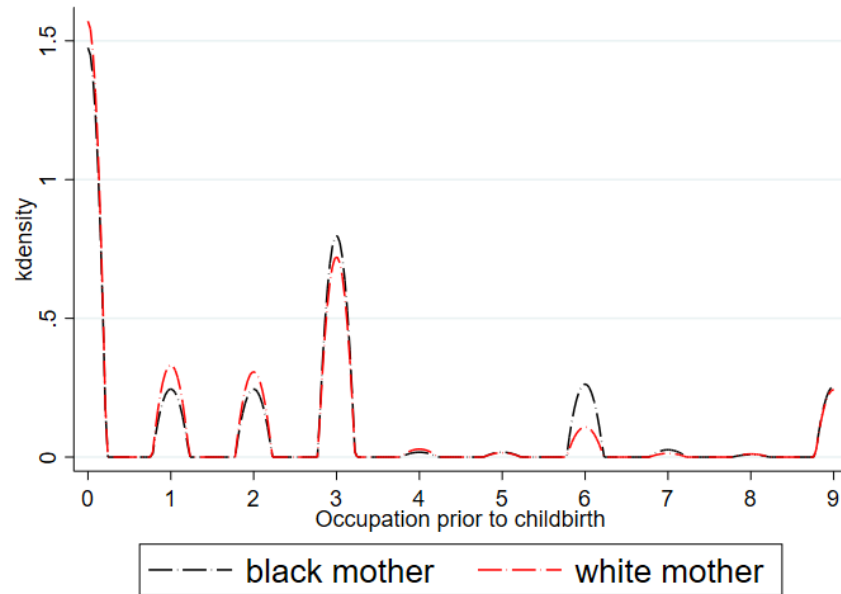


**b. with weighting**

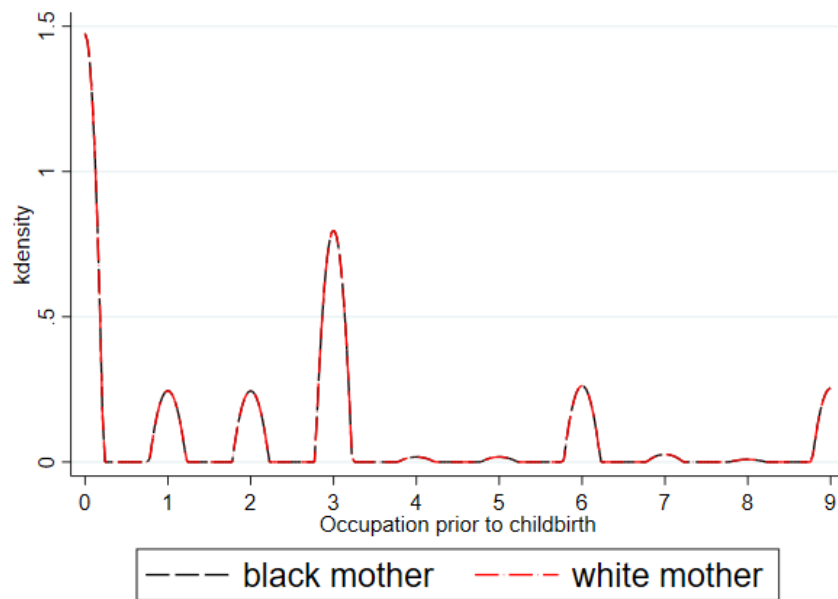


**Figure A2.2 Wife occupation**

**a. Without weighting**

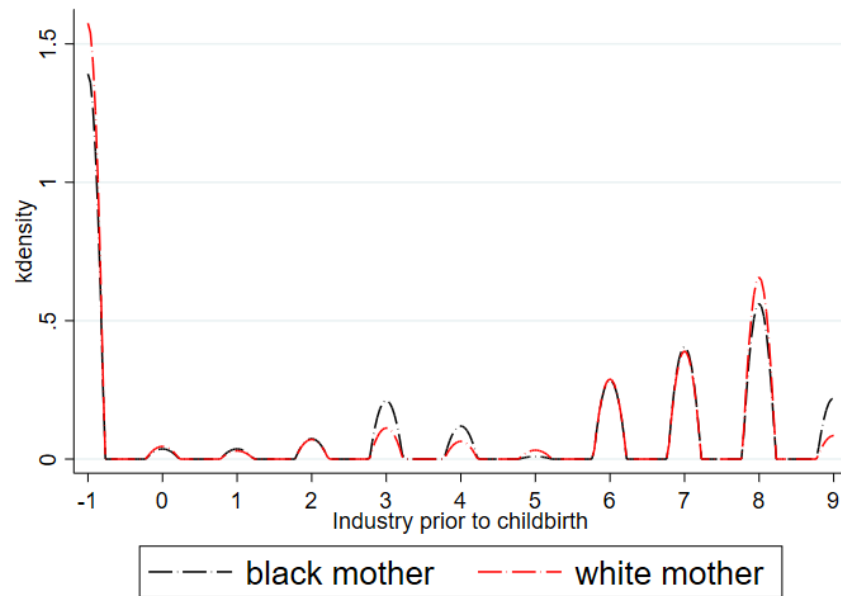


**b. with weighting**

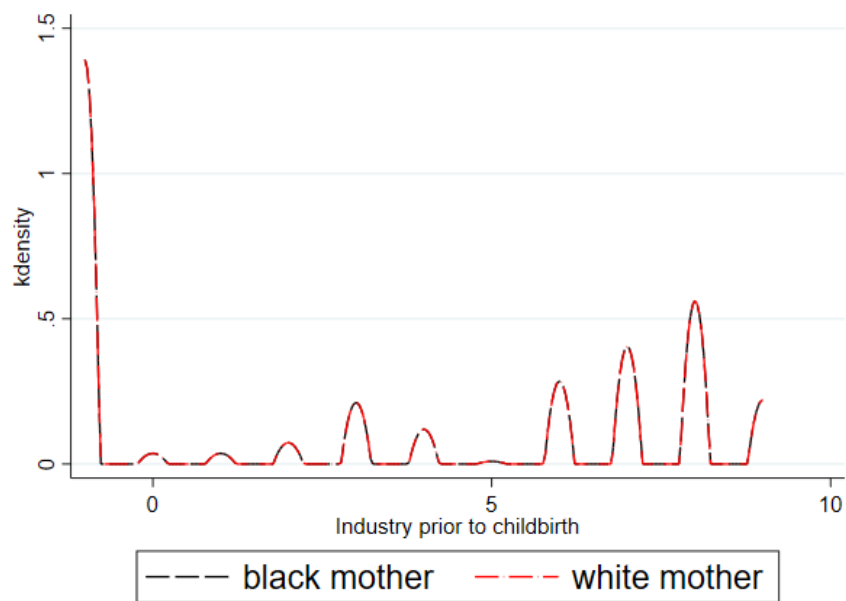


**Figure A2.3 Wife industry**

**a. Without weighting**



**b. with weighting**



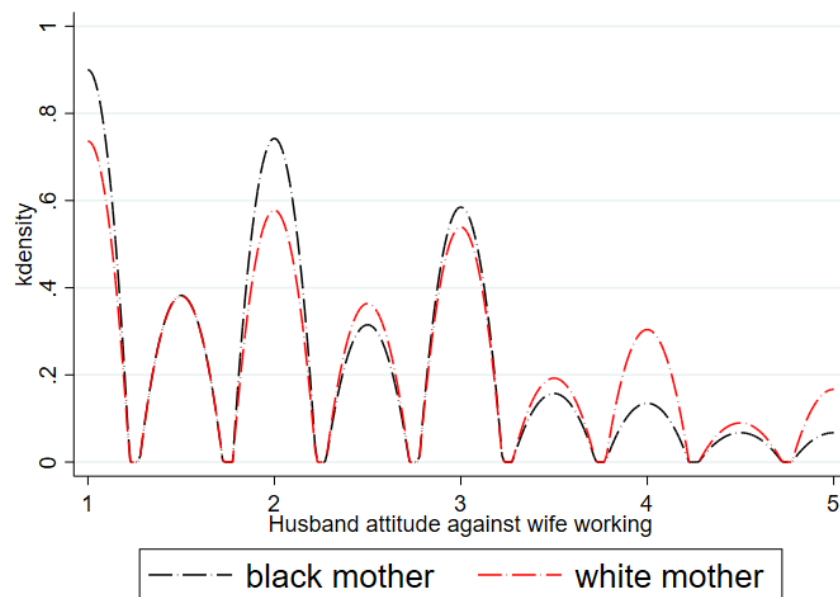
## Appendix. A3

Gender attitude question in interview is “How does your husband feel about (your working/the possibility of your working)? Is he very much in favor of it, somewhat in favor of it, neither for nor against it, somewhat against it, or very much against it?”

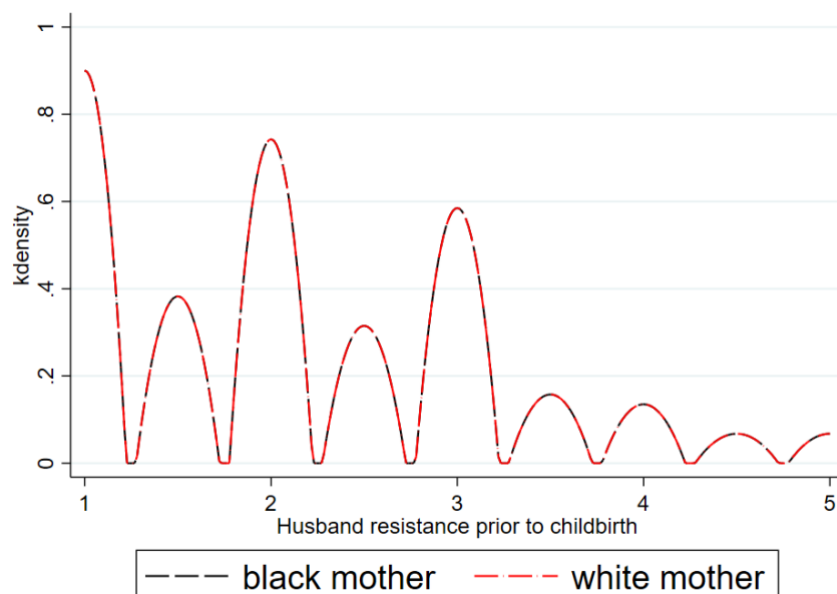
The answer is valued 1 if it is “Very much in favor”, 2 if it is “Somewhat in favor”, 3 “Neither for nor against”, 4 “Somewhat against” and 5 “Very much against”.

**Figure A3. Husband attitude against wife working**

**a. Without weighting**

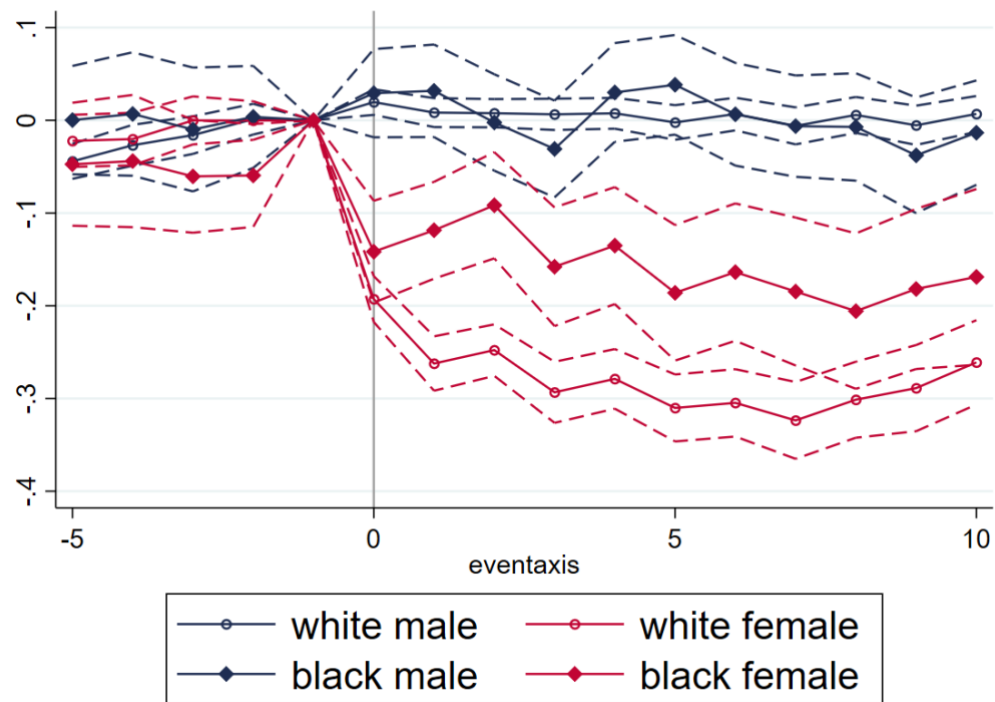


**b. with weighting**



## Appendix. A4

Sample consists of homeowners only



Sample consists of three-people households only

